

ON THE WHITE EUCLEIDÆ AND THE LARVA OF  
CALYBIA SLOSSONIÆ (PACKARD).

PLATE V.

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There are in Europe and Asia a number of moths colored white or nearly so, belonging to the family Hypogymnidæ (Lymantriidæ=Liparidæ). In the earlier days of the description of American species, several kinds were found superficially resembling them, which were therefore described as Liparidæ and are still listed so in Kirby's catalogue, though really presenting fundamental differences. However, as early as 1882, Dewitz showed that one of the larger species was a Eucleid from an examination of a cocoon, and, some ten years later, Packard was led to the same conclusion in describing one of the smaller species which Mrs. Slosson had then just discovered in Florida.

The species are all subtropical, inhabiting regions where not much entomological work is being done; but fortunately one of them extends into our country and I was able to discover the larva, the characters of which confirm the opinions of Dewitz and Packard. They are here presented at length.

I have examined Grote's types of *Phyrne immaculata* and *Euproctis pygmaea*, sent me by Dr. Skinner. There is no question but that the former is Packard's *Eupaya nivalis*. Grote's type bears the cocoon and number 229. This particular specimen was not sent me, but Dr. Skinner states that it is a female, which accounts for the non-pectinated antennæ. Two specimens with the same labels "Cuba" and "Dr. Wilson" were sent.

Genus *Calybia* Kirby.

1865.—*Phyrne*, Grote, Proc. Ent. Soc. Phil. V, 246 (preoc. Rept. 1843).

1892.—*Calybia*, Kirby, Cat. Lep. Het. I, 446.

1893.—*Eupaya*, Packard, Ent. News, IV, 169.

*Synopsis of Species.*

Under side of primaries entirely white.....**immaculata** Grote.

Under side of primaries partly gray, especially along costa.

Secondaries white above.

Primaries white above.

An inconspicuous yellowish dot near anal angle in male.

**slossoniæ** Fack.

A distinct zigzag yellow-brown mark above anal angle.

	<i>pygmæa</i> Grote.
A subterminal smoky band on primaries.....	<i>fumosa</i> Grote.
Secondaries gray above.....	<i>jamaicensis</i> Schaus.

### Genus *Leucophobetron*, nov.

There are two species which differ from *Calybia* in the much larger size (25 to 35 mm.) and the divergent tufts at the tip of the abdomen in the male, both described as Liparidæ. Dewitz has shown (N. Act. K. Leop. Deut. Akad. Nat. xlv, 252) that one of them is a *Eucleid* and it is probable that the other is also. The first is *L. argentiflua* \* Geyer (Samml. Exot. Schmett, iii, pl. 18, 1836), from Cuba; the second is *L. argyrorrhæa* Hübn. (Zuträge Exot. Schmett., ii, Figs. 245, 246, 1823). For convenience I would separate them from *Euproctis* and *Eupaya* under the above term.

#### *Synopsis of Species.*

Wings with a large dark spot above anal angle.....	<i>argentiflua</i> Gey.
Wings white, immaculate.....	<i>argyrorrhæa</i> Hübn.

### *Calybia slossoniæ* (Packard).

1893.—Packard, Ent. News, IV, 169.

1894.—Neumœgen & Dyar, Journ. N. Y. Ent. Soc. II, 111.

1895.—Dyar, Can. Ent. XXVII, 15.

1895.—Dyar, Can. Ent. XXVII, 245.

#### LARVA.

1897.—Dyar, Can. Ent. XXIX, 68.

1897.—Dyar, Journ. N. Y. Ent. Soc. V, 100.

#### SPECIAL STRUCTURAL CHARACTERS.

Outline elliptical, more narrowly so if the appendages are excluded; dorsal space broad, even, flat; lateral space broad, sloping, rounded; subventral space rather broad, continuous with the lateral space, not retracted. Ridges practically absent, the subdorsal indicated by the change in slope between back and sides. Tubercles greatly modified, as in *Phobetron*. In stage I a subdorsal row of single spines with enlarged bases, two on joints 3 and 13; lateral spines obsolete, represented by obscure papillæ; subventral setæ large and distinct. Ultimately the subdorsal warts are attached narrowly, but with very broad bases, encroaching on the dorsal and lateral spaces and produced later-

\* Mr. W. F. Kirby has very kindly examined Hübner's works for this species and has sent me the above correction to the reference in his catalogue.

ally into fleshy appendages of nearly equal length, the anterior ones a little shorter. These appendages are constricted at about the centre of attachment, the basal portion forming an elevated heart-shaped piece, bearing seta i above, the terminal part forming a tapering horn with seta ii at the apex. The lateral row of warts are rudimentary, consisting of small, naked finger-shaped papillæ, hardly larger than the spiracles. The subdorsal horns may be detached, but less readily than in *Phobetron*, and they leave a slight scar, from which a very little fluid exudes. The appendages are situated on joints 3 to 13, one more than in *Phobetron*, and are directed downward so as to touch the leaf and cover the sides. The warts bear long, finely feathery fringe-hairs with smooth bases, other short smooth hairs, short club-shaped feathered hairs and the primitive setæ i and ii. The skin is covered with a rather dense coating of fine, short, pale hairs from large colorless tubercles. No depressed spaces seen; the skin is hollowed laterally, but in an ill-defined manner. The warts are not shed on forming the cocoon. There are no stinging spines.

This interesting larva is colored to escape observation. The adaptation is the same as is *Sisyrosea textula*, but derived from a phylogenetically dissimilar stock. The fringing horns consist of the subdorsal instead of the lateral series and the fringe hairs are feathered secondary setæ instead of degenerated stinging spines.

#### AFFINITIES, HABITS, ETC.

The only close ally of this larva among our species is *Phobetron*, and, quite unexpectedly, it is a very close ally. Dr. Packard, judging from the moth, was of the opinion that it was not allied to *Phobetron*, placing it near *Heterogenea*. I placed it still further away, in the Megalopygidae. The larva has all the essential characters of *Phobetron*, even in some detail. The adaptation being different, the superficial appearance is different, resembling *Sisyrosea* rather closely, but it really has no near affinity with the spiny Eucleids. From *Phobetron* it differs as follows: (1) the middle tubercle of joint 4 is absent; (2) the lateral tubercles are reduced to insignificant papillæ instead of existing as small warts; (3) the subdorsal horns are all of the same length, the weak segments of stage I appearing only in the coloration in certain examples, which lack the red tips on the horns that are short in *Phobetron*; (4) there is a horn on joint 3 instead of a small wart; (5) the color is green instead of brown, with a thinner hair coating. The larva is more specialized than *Phobetron* on the whole. In the equal length

of the horns it would be lower, except that this character may not be primary. The hairs are also less specialized.

The allies of our *Calybia* are in the West Indies and on the South American coast, as seen by the species reviewed above. *C. slossonica* is the Floridian representative of *C. pygmaea* Grote from Cuba, differing from it in the smaller size of the mark at the anal angle. My male specimens all possess a small but evident yellowish mark in this location. In the females it is absent.

During the winter season the cocoons of *C. slossonica* may be found more or less commonly on the leaves or bark of the mangrove trees throughout southern Florida. The chalky white cocoons are very conspicuous on the green leaves, but on the whitish bark hard to detect. The white color of the moth seems to have the same protective value. It is remarkable why so many of the cocoons are spun upon the leaves, as if the instinct to seek the place for which the cocoon is adapted were lapsing. As the larvæ live on a plant which is always situated in water, they never leave it, even to spin. The moths emerge in about seven weeks, but scattering. The eggs are laid almost at once. They hatch in 15 days. The larvæ are solitary, resting on the under sides of the leaves; when young they eat little spots and channels through the lower epidermis, but at maturity the whole leaf is eaten as usual.

#### DETAILED DESCRIPTION OF CERTAIN STAGES.

*Egg*.—Elliptical, flat, somewhat irregular in size and shape, but never circular; translucent, pale yellow both on glass and leaves;  $1.6 \times 1.9$ ,  $1.4 \times 1.2$ , etc. Laid singly. Reticulations rather prominent, quadrangular, irregular, distinct. The form of the developing embryo may be rather plainly seen (Plate V, Figs. 1 to 14).

*Stage I*.—Head retracted, joint 2 mostly exposed. Dorsum flat, the sides nearly perpendicular, rounded. A subdorsal row of spines, the basal portion enlarged next the body, tapering, ribbed; distal part stiff, dark. Arrangement as in *Phobetron* except for the absence of the lower spine on joint 4. Lateral spines reduced almost to obliteration (Plate V, Fig. 15). Segments 7, 9 and 11 weak, as shown by the horns leaning out. Pale yellowish, an irregular, geminate, brown dorsal line and a broader dark subdorsal shade below the subdorsal horns. Bases of the tubercles white. Length .75 mm.

*Last Stage*.—Elliptical, rather thick centrally, but pressed down at each end, fringed by the conical fleshy appendages (Plate V, Fig. 22). Anterior pair short, curved, the rest straight, of about equal

length after the fourth pair. Short haired above, fringed on the sides with long, soft, white hairs (Plate V, Fig. 20), which form a continuous, though not very conspicuous fringe. At the base of the appendages, the fleshy, heart-shaped pieces rise above the dorsum and also above the base of the appendage, converting the dorsal area into a channel. They have short, rudimentary white hairs (Plate V, Fig. 21), besides seta i. Color light yellowish green, all the horns tipped with orange red, most so anteriorly. A blood red, diamond-shaped patch with whitish centre in the depressed dorsum on joints 4-5, 7, 9 and 11, four patches, the anterior one slightly elongate. Horns on joints 3 and 4 very faintly orange shaded. Sides hid by the horns, smooth, green. The traces of the lateral horns are seen with difficulty on removing the horns, as small whitish papillæ. Subventral setæ below the spiracles rather distinct. The horns arise about the centre of the segments from small depressions, and there is a smooth bulge of the skin below. The spiracle on joint 5 is in line with the others, but appears slightly unsymmetrical, rather higher on the fold in proportion. In the beginning of the stage the larva is all green, the dorsal marks appearing gradually. They vary somewhat in different examples. In another example the horns on joints 7, 9 and 11 were without the red tips. Lateral papillæ on joints 3, 4, 6 to 12.

*Cocoon*.—Rounded, elliptical, white, with streaks of brown without, brown within; the usual circular lid (Plate V, Fig. 24). In spinning, the larva elevates the horns and begins to spin silk around the base of its body. The cocoon is thus gradually built up, supported against the larva itself until finally the horns are enclosed. They do not become detached. The silk first formed dries white, making the white color of the cocoon, through which the brown appears in spots.

*Food-plant*.—Mangrove (*Rhizophora mangle*).

#### PARASITES.

Tachinid flies, which are usually such frequent parasites of Euclid larvæ, seem to be absent in this case. This is doubtless due to the peculiar habitat of *Calybia*, for if the Tachinæ should infest these larvæ, the maggots would all perish at the time of pupation by falling in the water.

Two hymenopterous parasites infest the larvæ freely. One (*Pelecystoma eupayæ* Ashm.) destroys the life of the larva while it is in the last stage. The host retains a life-like shape, but becomes bright red (Plate V, Fig. 23) and hardens. The parasite issues from a hole in

the empty larva skin, which remains adhering to the leaf, still presenting the appearance of the figure.

The second parasite (*Crypturus dyari* Ashm.) is even more abundant, infesting nearly half of the cocoons found. It shows no sign till the larva has spun, when, instead of the moth, the hymenopteron appears, eating a jagged hole in the cocoon, instead of emerging by the lid. The full grown larvæ of the insect may be found by opening the *Calybia* cocoons at the right time. It is flattened ventrally, dorsal segments arched, distinctly segmented, 13 segments including the head. A prominent substigmatal ridge along joints 5 to 12, just below the small spiracles, fluted by the incisures. The body is thickest at joints 7 and 8 and tapers each way to the rounded ends. Head small, membranous, rounded, smooth, somewhat bulging in the position of the imaginal eyes; no ocelli; antennæ represented by two tiny points; labium somewhat prominent, the only distinct organ, with folds or sutures marked faintly in brown. Color uniform whitish yellow, slightly shiny, rather opaque. Dorsal vessel less opaque, appearing darker, substigmatal ridge whitish. The skin surface, except on the head, is marked with very small rounded colorless granules, regularly spaced at about twice their own diameter from each other. The diameter is about .01 mm. Length of larva 6.5 mm., greatest width 3.3 mm., greatest thickness 2.5 mm.

Mr. Ashmead's description of these parasites has appeared in the Canadian Entomologist.

#### EXPLANATION OF PLATE V.

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| Fig. 1. Egg; unfertilized $\times 13$ . | Fig. 15. Larva, stage I (semidiagrammatic). |
| " 2. Egg, segmenting, 30 hours.         | " 16. Subdorsal spine of stage I enlarged.  |
| " 3. Embryo, 50 hours.                  | " 17. The same, not fully expanded.         |
| 4. Embryo, 60 hours.                    | " 18. Skin setæ of mature larva, enlarged.  |
| 5. Embryo, 100 hours.                   | " 19. A short, stiff hair.                  |
| 7. Embryo, 5 days.                      | " 20. A long, feathered hair.               |
| 8. Embryo, 7 days.                      | " 21. Short, feathery or branched hair.     |
| 9. Embryo, 8 days.                      | " 22. Mature larva $\times 4$ .             |
| 10. Embryo, 9 days.                     | " 23. Parasitized larva.                    |
| 11. Embryo, 10 days.                    | " 24. Cocoon on a twig.                     |
| 12. Embryo, 12 days.                    | " 25. Moth of <i>Calybia slossoniae</i> .   |
| 13. Embryo, 14 days.                    |   |
| 14. Embryo, 15 days.                    |   |